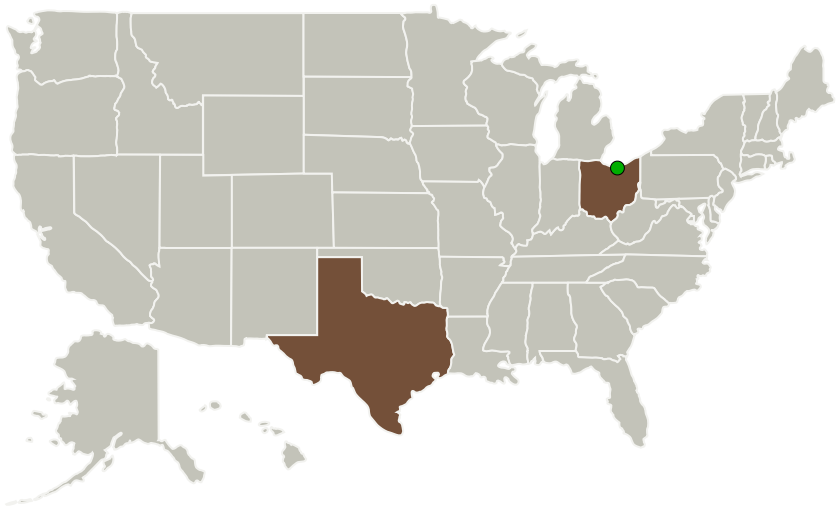
Flexible Particle Filter Navigation System for Analysis and Operations, Phase I

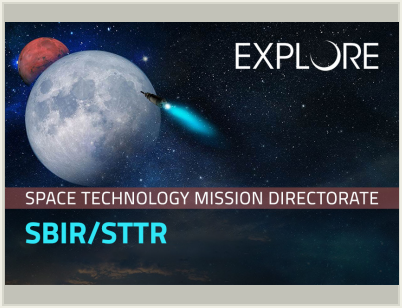
Completed Technology Project (2011 - 2011)

Project Introduction

Odyssey Space Research proposes to develop a modular navigation software package to provide precise state information for offline analysis and real-time applications. This navigation package will use particle filter methodology to process discrete observation data and maintain an accurate state. This navigation system will leverage several NASA products to rapidly prototype and demonstrate the feasibility of this software during Phase I, including the General Mission Analysis Tool (GMAT) and Trick, taking it from TRL 2 past TRL 3. Phase II will deliver an expanded modular software product integrated into several other software packages demonstrating different estimation capabilities (TRL 5-6). This system will function as a standalone estimation package that can be easily integrated into other software packages, or as the basis for embedded flight software algorithms. This navigation package will be designed to meet the position, velocity, and time estimation requirements for space missions. It will contain an expanded state vector used to estimate non-Gaussian forcing functions perturbing the vehicle's dynamics. This navigator will integrate the measurements from diverse sensors running at different rates. And it will demonstrate accurate estimation of uncertain dynamics parameters that are affecting the vehicle's state such as the gravitation field of small bodies.

Primary U.S. Work Locations and Key Partners





Flexible Particle Filter Navigation System for Analysis and Operations, Phase I

Table of Contents

Flexible Particle Filter Navigation System for Analysis and Operations, Phase I

Completed Technology Project (2011 - 2011)

Organizations Performing Work	Role	Type	Location
Odyssey Space Research, LLC	Lead Organization	Industry Women-Owned Small Business (WOSB)	Houston, Texas
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138167)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Odyssey Space Research, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

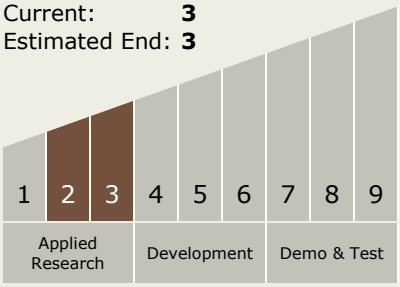
Carlos Torrez

Principal Investigator:

Blair Thompson

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Flexible Particle Filter Navigation System for Analysis and Operations, Phase I

Completed Technology Project (2011 - 2011)

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System